SYSTEM 6

NAVSHIPS 0967-200-3020

VOLUME II

TECHNICAL MANUAL

OPERATION INSTRUCTIONS

RADIO TRANSMITTER T-827B/URT AND T-827E/URT

Bendix Communications Division
N00039-65-C-0117

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Published by direction of Commander, Naval Electronic Systems Command.

SUPERSEDING ISSUE OF 23 FEBRUARY 1967

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SECTION 2
OPERATION

2-1. FUNCTIONAL OPERATION.

2-2. GENERAL. Radio Transmitter T-827B/URT (hereafter referred to as the T-827B/URT) is designed to transmit upper sideband (USB), lower sideband (LSB), continuous wave (CW), compatible amplitude modulated (compatible AM), and frequency shift keyed (FSK) signals in the 2.0- to 29.9999-MHz frequency range. The T-827B/URT has a self-contained power supply, and is used as a driver amplifier for an associated rf power amplifier. The T-827B/URT is compatible with RF Amplifier AM-3007/URT when installed in an AN/WRC-1B system.

2-3. OPERATION. Audio signals from the handset are applied to the Audio Amplifier Electronic Assembly in the T-827B/URT. The signals are amplified and coupled to the balanced modulator in the Mode Selector Electronic Assembly, where the audio signal is translated into an if. signal.

2-4. When compatible AM or CW transmission is used, the carrier is reinserted into the signal path in the IF. Amplifier Electronic Assembly. The output from the IF. Amplifier Electronic Assembly is applied to the RF Translator Electronic Assembly, where it is translated to the desired rf output by mixing it with three injection frequencies in a triple-conversion process. The RF Amplifier Electronic Assembly, which provides the final stages of the transmitter, is digitally tuned and provides a nominal 0.1-watt output to the associated rf power amplifier.

2-5. When FSK transmission is used, the FSK Tone Generator Electronic Assembly is turned on. Loop current from the ancillary teletype (tty) equipment produces a frequency shift output, which is centered on one of two selectable center frequencies, depending on the ancillary equipment used. The output is applied to the USB Audio Amplifier Electronic Assembly, and from that point, the process is the same as described above.

2-6. The T-827B/URT is tuned by setting the MCS and KCS controls and the CPS switch on the front panel at the desired frequency. An internal power supply converts the nominal 115-Vac input to the necessary dc operating voltage.

2-7. OPERATING PROCEDURES.

2-8. GENERAL. When the T-827B/URT is to be used as part of the AN/WRC-1B system, refer to the Technical Manual for Radio Set AN/WRC-1B and Antenna Coupler CU-937/UR. When the T-827B/URT is to be used as part of a system other than the AN/WRC-1B, refer to the Technical Manual for the associated equipment.

2-9. DESCRIPTION OF OPERATING CONTROLS, INDICATORS, AND CONNECTORS. All controls and indicators required for normal operation of the T-827B/URT are located on the front panel (figure 2-1) and are listed in table 2-1.

2-10. SEQUENCE OF OPERATION. To operate the T-827B/URT, proceed as follows:

a. Set associated rf amplifier PRIMARY POWER circuit breaker at ON and set T-827B/URT Mode Selector switch (figure 2-1) at STD BY. Set these switches prior to operation to allow the T-827B/URT frequency standard to come up to temperature. Allow a 20-minute warmup period for general operation and at least a 60-minute warmup period for optimum frequency stability.

b. Set Mode Selector switch at USB, LSB, or AM position for voice transmission.

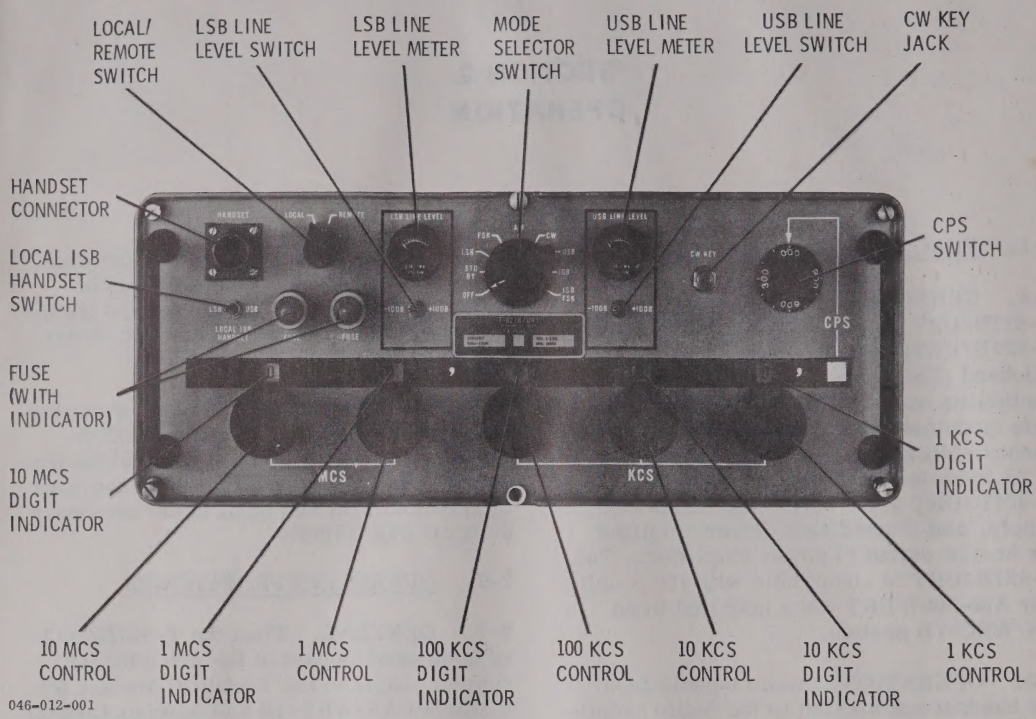

Figure 2-1. Radio Transmitter T-827B/URT, Operating Controls, Indicators and Connectors

c. Using MCS controls, KCS controls, and CPS switch on front panel of T-827B/URT, select desired operating frequency. Frequency selected will be displayed in the small digit indicator windows above MCS and KCS controls.

d. Connect handset to HANDSET connector on front panel of T-827B/URT.

e. To transmit, depress push-to-talk switch on handset.

f. For independent sideband, set Mode Selector switch at ISB and set transmitter LOCAL ISB HANDSET switch at either LSB or USB, according to channel desired.

g. For CW transmission, set Mode Selector switch at CW. Connect CW key to CW KEY jack on front panel of T-827B/URT and operate key.

h. For FSK transmission with local teletype equipment, set Mode Selector switch at FSK and connect teletypewriter loop and key lines to LOCAL FSK IN connector (J7) on rear of T-827B/URT. When these procedures are completed, proceed as follows:

1. Loosen screws on front panel of T-827B/URT and pull chassis out fully on slides.

2. Set CTR FREQ switch on top of FSK Tone Generator Electronic Assembly at desired center frequency (2000 or 2550 Hz). The FSK Tone Generator Electronic Assembly is located just left of center at rear of chassis.

3. Release slide locks, slide chassis back into case, and secure.

TABLE 2-1. RADIO TRANSMITTER T-827B/URT, OPERATING CONTROLS, INDICATORS, AND CONNECTORS
(See Figure 2-1)

CONTROL, INDICATOR, OR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
LOCAL ISB HANDSET switch	A2S9	Selects channel of handset audio input and receiver sidetone in ISB and ISB/FSK modes. Switch Position — Equipment Response LSB — Applies handset audio microphone and earphone to LSB channel USB — Applies handset audio microphone and earphone to USB channel
HANDSET connector	A2J1	Used to connect handset to T-827B/URT
FUSE (with indicator)	A2F1, A2DS1	Protects T-827B/URT against overload; indicator glows when fuse is open
FUSE (with indicator)	A2F2, A2DS2	Protects T-827B/URT against overload; indicator glows when fuse is open
LOCAL/REMOTE switch	A2S1	Selects local or remote key and input to T-827B/URT Switch Position — Equipment Response LOCAL — T-827B/URT keying and input accomplished locally by operator REMOTE — T-827B/URT keying and input accomplished from a remote location

TABLE 2-1. RADIO TRANSMITTER T-827B/URT, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Cont)
(See Figure 2-1)

CONTROL, INDICATOR, OR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
LSB LINE LEVEL switch	A2S10	Selects range for LSB LINE meter Switch Position — Equipment Response -10 DB — 10 dB is subtracted from LSB LINE LEVEL meter indication +10 DB — 10 dB is added to LSB LINE LEVEL meter indication
LSB LINE LEVEL meter	A2M1	Indicates LSB audio input line level
Mode Selector switch	A2S2	Selects T-827B/URT mode of operation Switch Position — Equipment Response OFF — No power is applied STD BY — Energizes frequency standard and tube filaments LSB — T-827B/URT operates in LSB mode FSK — T-827B/URT operates in FSK mode (850-Hz shift in USB bandpass) AM — T-827B/URT operates in compatible AM mode (USB modulation plus carrier) CW — T-827B/URT operates in CW mode (transmitted frequency is a front-panel frequency setting) USB — T-827B/URT operates in USB mode ISB — T-827B/URT operates in ISB mode (simultaneous transmissions on LSB and USB)

TABLE 2-1. RADIO TRANSMITTER T-827B/URT, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Cont)
(See Figure 2-1)

CONTROL, INDICATOR, OR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
Mode Selector switch (Cont)		Switch Position — Equipment Response ISB/FSK — T-827B/URT transmits FSK on USB and voice on LSB, simultaneously
USB LINE LEVEL switch	A2S11	Selects range for USB LINE LEVEL METER Switch Position — Equipment Response -10 DB — 10 dB is subtracted from USB LINE LEVEL meter indication +10 DB — 10 dB is added to USB LINE LEVEL meter indication
USB LINE LEVEL meter	A2M2	Indicates USB audio input line level
CW KEY jack	A2J2	Used to connect local CW hand key to T-827B/URT
CPS switch	A2S6	Increases T-827B/URT tuning capabilities Switch Position — Equipment Response 000 — T-827B/URT is tuned to frequency indicated by MCS and KCS digit indicators 100-900 — T-827B/URT is tuned in 100 to 900 Hz above frequency indicated by MCS and KCS digit indicators

TABLE 2-1. RADIO TRANSMITTER T-827B/URT, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Cont)
(See Figure 2-1)

CONTROL, INDICATOR, OR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
MCS Controls		
10 MCS		Selects 10-MHz digit of desired operating frequency; digit selected will be displayed in window above control.
1 MCS		Selects 1-MHz digit of desired operating frequency; digit selected will be displayed in window above control
KCS Controls		
100 KCS		Selects 100-kHz digit of desired operating frequency; digit selected will be displayed in window above control
10 KCS		Selects 10-kHz digit of desired operating frequency; digit selected will be displayed in window above control
1 KCS		Selects 1-kHz digit of desired operating frequency; digit selected will be displayed in window above control

i. To transmit FSK and voice simultaneously, set Mode Selector switch at ISB/FSK. (FSK will be on USB; voice on LSB.)

j. To transmit two simultaneous voice or other audio transmissions from a remote location, set Mode Selector switch at ISB. One voice transmission will be on USB; the other voice transmission will be on LSB.

k. To transmit voice on different channels locally, set Mode Selector switch at ISB and alternate LOCAL ISB HANDSET switch between USB and LSB as desired to change channels.

2-11. SHUTDOWN PROCEDURE.

2-12. Shutdown of the T-827B/URT is accomplished as follows:

a. Set Mode Selector switch at OFF.

b. Set associated rf amplifier PRIMARY POWER circuit breaker at OFF.

NOTE

When it is desired to eliminate required warmup period, the PRIMARY POWER circuit breaker must be left at ON and the T-827B/URT Mode Selector switch must be left at STD BY.

2-13. OPERATORS MAINTENANCE.

2-14. OPERATING CHECKS AND ADJUSTMENTS. When the T-827B/URT is suspected of a malfunction, the operator should perform the following steps to determine the cause of the trouble:

a. Check to see that the T-827B/URT is set at proper frequency.

b. Check to see that primary power is applied.

c. Check all fuses. If any are open, associated indicator will light. Replace open fuses.

d. Check all cables for breakage and check connectors for proper locations and proper seating.

e. If operator cannot locate trouble, refer problem to maintenance personnel.

2-15. PREVENTIVE MAINTENANCE. Preventive maintenance that can be performed by the operator is listed in table 2-2.

2-16. EMERGENCY MAINTENANCE. If the T-827B/URT malfunctions while a technician is not available, the operator should perform the following emergency repair procedures:

a. Try another mode of operation.

b. Perform steps a. through d. of paragraph 2-14.

c. Replace any damaged cables.

d. Loosen screws on front panel of the T-827B/URT and pull chassis out from case. Perform following checks:

1. Check all electronic assemblies for proper seating.

2. Check to see that vacuum tube filaments are lighted. If tubes in T-827B/URT are to be replaced, remove tube shield and pull tube out with a tube puller, applying a steady, straight-up pressure. The dust cover over the assembly can be removed if necessary.

TABLE 2-2. RADIO TRANSMITTER T-827B/URT, OPERATOR'S PREVENTIVE MAINTENANCE CHECKS

INSPECT FOR	REMEDY
Dust	Clean exterior with soft, lint-free cloth. Clean interior with brush, cloth, or compressed air.
Nicks, burrs, dents, scratches, or rust spots	Smooth burrs with a file. Sandpaper corrosion, rust, or scratches, and refinish.
Loose handles, mounting screws, or other hardware	Tighten loose hardware.
Chain drive binding	Oil lightly.
Cable assemblies broken, frayed, or damaged	Repair or replace.

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